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ABSTRACT

This document profiles five schools that were selected as winners of the "Fifth Annual Business Week Awards for Instructional Innovation: Schools in the Age of Technology": Bailey's Elementary School for the Arts and Sciences (Falls Church, Virginia); Hunterdon Central Regional High School (Flemington, New Jersey); John Muir Elementary School (Long Beach, California); Mainland High School (Daytona Beach, Florida); and Maxwell Middle School (Tucson, Arizona). Highlights include educational equity; research and practical knowledge; a multi-disciplinary inquiry approach; staff development and technology training; program implementation; technology resource centers; computer assisted learning; educational awards and recognition; educational communities and environments; equipment and classroom descriptions; parental involvement; student projects; academic achievement and test scores; partnerships with business; pilot programs; teacher partnerships; and educational technology for the future. A list of 10 Honorable Mention schools is provided with telephone numbers and the names of principals and superintendents. (AEF)

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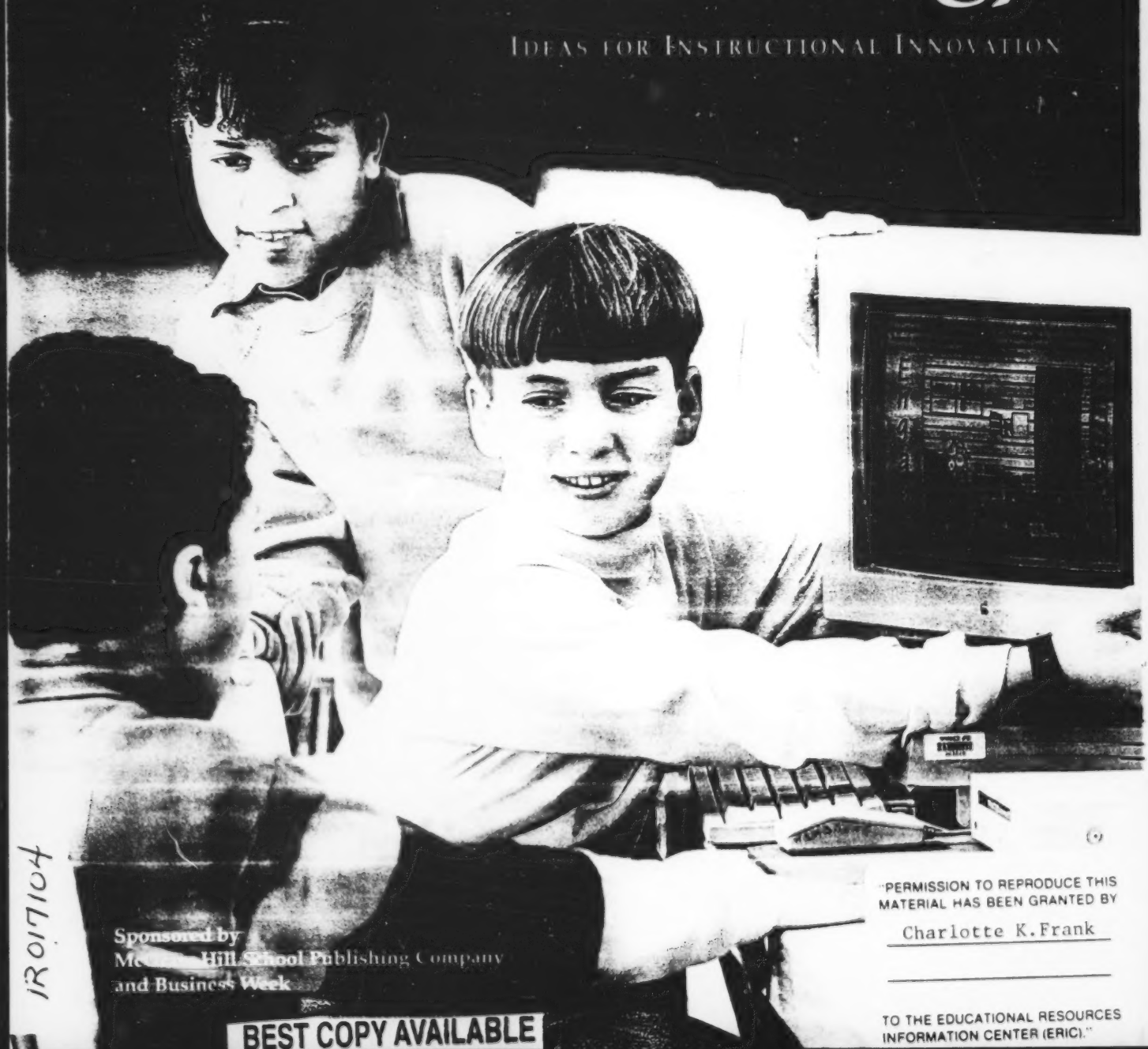
Schools in the Age of Technology

Ideas for Instructional Innovation



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Schools in the Age of Technology

IDEAS FOR INSTRUCTIONAL INNOVATION

McGraw-Hill School Publishing Company proudly presents case histories of five schools in the age of technology. For their instructional innovations, these schools are the national winners of the Fifth Annual Business Week Awards for Instructional Innovation.

SCHOOLS IN THE AGE OF TECHNOLOGY

Ideas for Instructional Innovation

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SCHOOLS IN THE AGE OF TECHNOLOGY – *Technology is now an integral part of all of our lives – both at home, and, increasingly, at work. So it makes sense, as we think about preparing today's students for the workplace of the twenty-first century, to teach them about technology.*

We at ***Business Week*** *and* ***McGraw-Hill School Publishing Company*** *feel that it is more than appropriate to applaud and recognize those schools that are striving to become* ***Schools in the Age of Technology.*** *We have selected five outstanding schools as winners of the* ***Fifth Annual Business Week Awards for Instructional Innovation: Schools in the Age of Technology.***

A ***School in the Age of Technology*** *is a place where students are excited by the possibilities that learning with technology provides. It's a place where students engage in problem solving, critical thinking, and exploration. It's also a place where teachers, students, parents, businesses, and the community can form learning partnerships.*

These five schools are already sharing their innovations with the local and national communities. It is our hope that more schools will become inspired by their ongoing work, for these ***Schools in the Age of Technology*** *are creating new standards of excellence and enthusiasm.*

Please call these schools' principals and superintendents for more information and strategies. They are eager to share what they have learned, and as their excellence is passed on, we as a community will benefit.

Peter Jovanovich
President & CEO
McGraw-Hill School Publishing Company

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At Bailey's, students, staff, and community work together to achieve success.

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Flemington, New Jersey

Judy Gray, Ed.D., Director of Academy for Continual Development
Raymond P. Farley, Superintendent

In recognition of Hunterdon Central's excellence in instructional technology, Governor Christine Todd Whitman presented the school with the first New Jersey Star School Award.

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E. Sue Lagerborg, Principal
Carl Cohn, Ph.D., Superintendent

A 1993 Federal Magnet Assistance Grant helped bring John Muir into the age of technology.

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Daytona Beach, Florida
Timothy J. Huth, Principal
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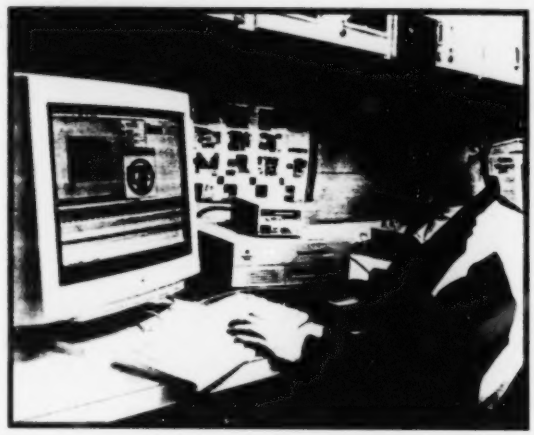
At Mainland High School, technology touches on every aspect of a student's life.



MAXWELL MIDDLE SCHOOL 10

Tucson, Arizona
Don W. Collier, Principal
George Garcia, Ed.D., Superintendent

At Maxwell Middle School, success is measured on both a professional and personal level.

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Bailey's Elementary School for the Arts and Sciences

Bailey's Elementary School in Fairfax, Virginia, has been recognized by the Virginia Department of Education as one of the state's ten Exemplary Technology Projects in Education. But more than that, Bailey's is a school where students, staff, and community work together to achieve success.

Technology has great appeal for students. With good reason: At a child's fingertips lies the ability to create what seems almost magical. For students who are hampered by a lack of familiarity with English, the sense of empowerment that technology can provide is breathtaking.

Educational Equity

At Bailey's Elementary School in Fairfax County, Virginia, the number of students whose primary language was something other than English had risen to over 90% by 1990. Pushed beyond frustration by their children's lack of exposure to the English language in the school setting, the PTA called a meeting of all parents and provided translators. The results: Parents wanted more English speakers in the classroom so that newcomers could more quickly absorb and learn the language.

In March 1991, the Fairfax County School Board voted to designate the school a magnet school—thus guaranteeing increased interest in the school from English-speaking parents and students.

Using Research and Practical Knowledge

It's a big step from conception to execution. How was the school going to both attract and hold English speakers, and provide the educational equity that Bailey's parents demanded? A planning committee of teachers, parents, administrators, education specialists, technology resource specialists, university and Smithsonian Institution representatives worked for over a year to solve the problem.

What they came up with was a synthesis of research and practical knowledge. In *Making Connections: Teaching and the Human Brain*, Renate Caine cites brain research that verifies that the best learning takes place when students make connections between their own experiences and what is being learned. In addition, committee members were sensitive to the fact that technology is playing an ever-increasing role in the workplace. They concluded that the potential of technology for students is almost limitless.

A Multi-Disciplinary Inquiry Approach

Thus, Bailey's Elementary School developed and adopted a multi-disciplinary inquiry approach, with subject areas interrelated through a "conceptual unit" method of instruction. Technology would play a key role—as a tool students could use to acquire information, and as an extraordinarily rich means by which students could present the information they had acquired.

How does this translate into a student's day-to-day life?

Meet Diana, a fifth grader. Her day begins in the communications lab as a newswriter for Bailey's News, which is broadcast at 8:50 every morning to all classrooms. Once the news is written, it is filmed with background sound and reported by students.

Diana then goes to her classroom, where she is studying ancient Egypt. Together with several other students, she goes to the library and researches the Egyptian use of herbs, using Grolier's Encyclopedia on CD-ROM. The group then moves to the science lab and conducts experiments with a witch hazel plant to create an astringent.

Next, Diana goes to videotape the rehearsal of the student-scripted play on the discovery of King Tut's tomb. In music, she plays with a group using Orff instruments as background for the play. After language arts in the class-

room. Diana goes to the technology resource center to edit her article on Egyptian herbs to submit to the student editor, who finds a place for it in the class newspaper.

A Committed Staff

At the heart of Bailey's program is a strong, committed, and well-educated staff. In addition to a week of technology training the first and second years for eight, then seven more teachers, all staff had two weeks of staff development in the summers of 1992, 1993, and 1994. Also, ongoing technology training sessions ('mini-macs') are offered twice a week in the technology resource center.

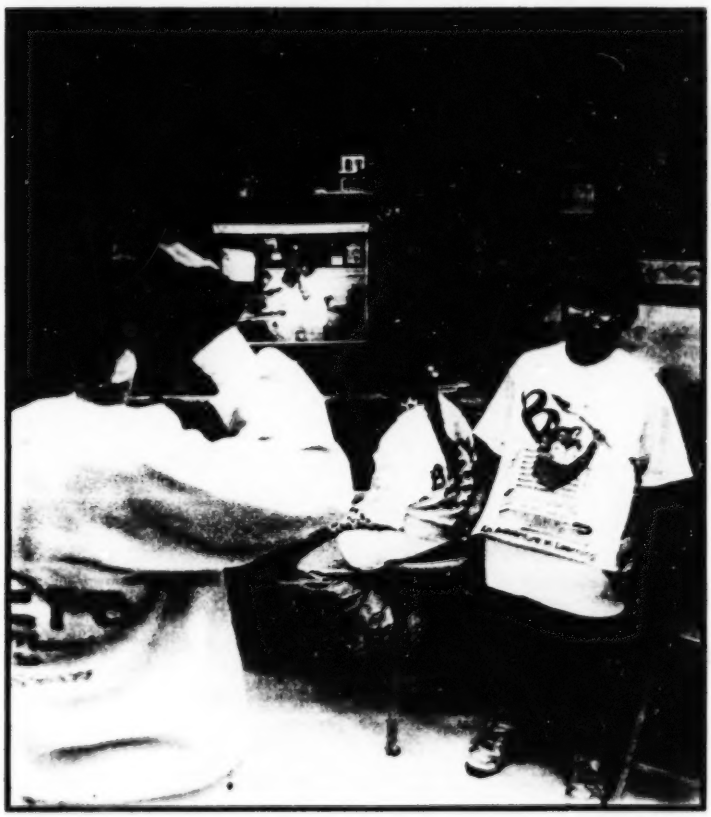
Technology training is available for volunteers and minority parent groups. Bailey's has both an Hispanic parent liaison and a Cambodian parent liaison in an effort to keep track of the assimilation needs of the two communities in the school—and to garner parental support for the school's activities.

Putting the Program in Place

Bailey's magnet program was put in place over the course of three years. Phase I included a technology resource center, located next to the library to facilitate research, staffed by a resource teacher and an instructional assistant. The center is equipped with Mac work stations, scanners, ImageWriter and laser printers, CD-ROMs and laser disc players, VCRs and modems. In addition, a science discovery lab staffed by a science resource teacher was a part of Phase I. The lab is also equipped with microscopes, probe ware, Lego Technik sets, a ripple tank, a stream table, a grow lab, and interactive science software.

Phase II added a performing arts theater, as well as a full-time performing arts teacher who works with all grade levels.

Phase III introduced communications. A half-time resource teacher teaches students video/sound and editing skills, enabling students to fully exploit technology's unique possibilities for displaying acquired information.



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At the heart of Bailey's program is a strong, committed, and well-educated staff.

Hunterdon Central Regional High School

At Hunterdon Central, students can access all networked school resources twenty-four hours a day via computer, telephone, and modem. This kind of "round the clock" learning is at the core of Hunterdon's vision of what school should be—that learning can take place at any time and that it should be student-directed.

At Hunterdon Central Regional High School in Flemington, New Jersey, the decision to commit energy and resources to technology was an easy one to make. When the staff formulated a plan that would revolutionize the school, their thinking was founded on one powerful idea: The students at Hunterdon had to come away from their high school experience as citizens of the twenty-first century, ready to face the future.

The Board of Education and the community fully supported the proposal.

Moving Towards the Twenty-First Century

Over the course of four years, carefully reallocated capital and surplus monies to the tune of $3.7 million transformed the campus. The Communications Building was finished in 1992, complete with a radio station and a cable station allowing students to broadcast on a daily basis. The eight existing buildings at Hunterdon were retrofitted, and now house, among other things, an instructional media center with a 35 CD-ROM tower accessible to every classroom, and four prototype classrooms in physics, applied technology, biochemistry, and fine arts.

In addition, every classroom at Hunterdon now has a video receiver, a computer, and a telephone.

The Faculty Is an Integral Part

As Hunterdon Central has moved forward, the staff's committment has increased. With that committment has come the realization that all staff members must be fully trained if technology is to succeed as an integral part of the school. Consequently, Hunterdon provides ongoing staff development programs through subject-specific departments and school-wide training programs.

In order to further support teachers at Hunterdon, the Hunterdon Central Academy for Continual Development was created. Through the Central Academy, teachers are awarded continuing education units for courses and workshops, which are offered at the school immediately following the teachers' work day, on weekends, and during school breaks.

Computers Support Learning

What about the students for whom all this technology has been put in place?

Their enthusiasm is evident. An ongoing report done by the Educational Testing Service of Princeton, New Jersey, indicated that, after the first year, students at Hunterdon find using computers motivational and that they prefer learning when computers support that learning.

One of the goals at Hunterdon has been to make the school resources available to students twenty-four hours a day, and it has achieved that goal. With a computer, a telephone, and a modem at home, any student can access school materials on CD-ROM or other library resources, or simply "chat" with another student. Gone are the days of forgetting homework assignments. Students and teachers are encouraged to make full use of staff voice mail, so that teachers are also available outside of school hours to assist students.

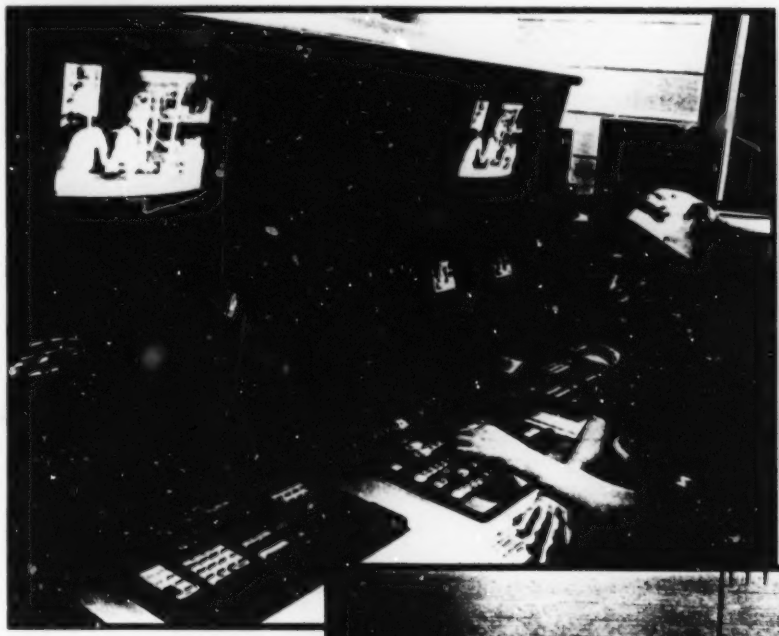
A Star School for Excellence

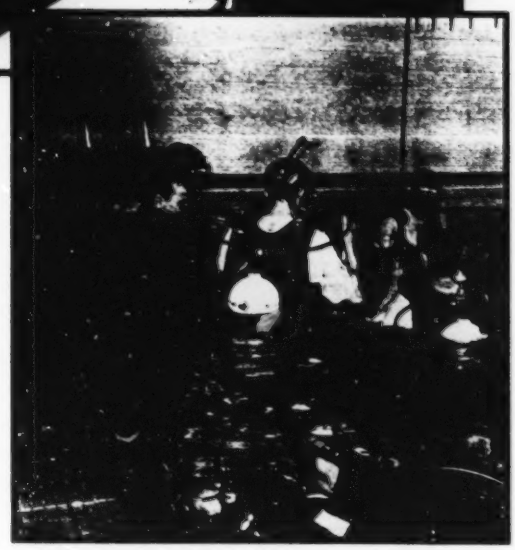
In 1994, Hunterdon was named New Jersey's first Star School for excellence in instructional technology and an

awareness of the twenty-first century. Factors that helped Hunterdon win the award were standardized test scores consistently above the state and national averages, the fact that 87% of graduating classes went on to two- and four-year colleges, and an annual average of five National Merit Scholarship finalists.

With the arrival of technology at Hunterdon Central comes a continued desire to find the best possible ways to help students learn. Hunterdon's goal is to move toward student-directed learning, and, as a result, the school has begun experimenting with four prototype classrooms.

Each prototype classroom is approximately 1,800 square feet, which is substantially larger than the average classroom. The added space allows students to move freely, to work in groups, and to be involved in learning. Staff and students can experiment with lighting, furniture arrangement, ventilation, and colors as well as computer stations and hardware configurations. The physics classroom is experimenting with a system that allows video to appear on each computer screen in the classroom.





Acquiring the Tools for Success

Hunterdon Central has already received national and international recognition for its innovative work. In addition to the New Jersey Star School award, over one hundred school districts and businesses have come to Hunterdon to see the school in action.

Hunterdon Central takes its mission very seriously: As we move increasingly towards an age of mandatory computer literacy, we must give our students the tools they will need to succeed. At Hunterdon, the twenty-first century has already arrived, and it has been embraced.

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John Muir Elementary

When John Muir Elementary received a Federal Magnet Assistance Grant in 1993, the school finally had a focus for the community's considerable energy. The parents, faculty, students, community-at-large, and MAC Muir have transformed the school into a place where magical things happen.

When a school's students are in danger of just not making it, success can only truly come when parents, staff, students, and the community agree that success is the only alternative.

This is exactly what happened at John Muir Elementary in Long Beach, California. The dream was there. MACMuir made it a reality.

Success Is the Only Alternative

For John Muir Elementary, located in an economically depressed area, success came from the very core of the community. With more than 97% minority representation, John Muir Elementary is a community school where the children don't have to ride a bus to get to school—they can walk. It is a community where homes have seen more than just one generation in a family grow up and get on with life. So when such a stable, proud community sets to work, things get done.

John Muir Elementary was established in the 1920s, razed by the 1933 earthquake, then rebuilt in its present location. Before 1993, the students at John Muir achieved academic scores that fell into a state mandated "school improvement" area. So when the school received a Federal Magnet Assistance Grant in the spring of 1993, the tremendous energy and enthusiasm of the school's community guaranteed that the school would embrace success.

When parents in the Long Beach Unified School District were surveyed about what the focus of the Magnet program should be, MACMuir (Media Assisted Communications at Muir) was the result.

Technology As the Linchpin

MACMuir is a communications program that embraces all curricular areas, using technology as the linchpin. With approximately $885,000, the school purchased equipment for a computer lab with thirty-six computers, twelve printers, a flatbed scanner, a fax modem, and a still video camera. Each classroom has three Macintosh computers configured into workstations, as well as a printer, and wall-mounted television and VCR station.

There is also a three-camera television studio equipped with a video editing system, control booth, and state-of-the-art special effects computer, "The Video Toaster." In addition, the school was rewired for closed-circuit television and the labs were electrically upgraded. Network wiring and modem wiring were installed as well.

Realizing that the equipment was not going to run itself, the school also allocated funds for training and in-servicing teachers and parents. This further highlights a major cause of John Muir's success: The emphasis by the staff and community on the competence and understanding of the staff and community.

Learning to Use the Tools

Staff training began during the summer of 1993. The school organized technology committees to implement the grant, set up staff development days, and sent teachers to conferences and technology seminars. Once in place, MACMuir generated such a degree of student enthusiasm that staff members continue to devote their own free time to continued training—and parents get in on the act, too. John Muir offers parent classes that are well-attended, as parents not only begin to understand what MACMuir is offering their children, but begin to see how technology can open doors in their own lives as well. With teachers, students, and parents all equally energized, positive results were inevitable.

On a day-to-day level, students use the technology at hand to help them with individual projects.

MACMuir Is Project Driven

MACMuir is project-driven. Staff and students at Muir are successfully learning how to apply skills and information learned in one area to problems encountered in other areas. Students continually engage in informal peer counseling as they put together a variety of projects.

One example of a project made possible by MACMuir is a video report students produced about a new Long Beach mandatory uniform rule. Local television news took notice, running the video on two channels and interviewing the students involved on three channels. Muir students have also produced video projects about Columbus landing in San Salvador, school rules for new students, and have "interviewed" characters from literature.

Using Technology at Every Level

On a day-to-day level, students use the technology at hand to help them with individual projects. For example: Their third, fourth, and fifth graders produced their own computer slide shows on topics such as the solar system, photosynthesis, microbes, fairy-tale elements, and the states. Kindergarteners and first and second graders wrote individual pages which were combined to form various classroom books.

John Muir Elementary has successfully managed to enhance the core curriculum through the use of technology. An end-of-the-year database evaluation reported that 100% of the parents are pleased with MACMuir, and 85% of the students felt that they had learned more.

Clearly, the school has managed to tap an enormous reserve of community support and enthusiasm. Parents, teachers, and students are all working together towards the same goal: Find exciting and effective ways to learn in the 90s—and prepare for the new century.

For More Information

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Mainland High School

Mainland High School is a Model Technology School for the state of Florida, where technology touches on every aspect of a student's life. Mainland has forged partnerships with businesses so that state-of-the-art equipment is routinely used. In addition, it has pioneered innovative personal physical fitness programs that allow students to design their own workouts.

At Mainland High School in Daytona Beach, Florida, technology has found its way into every corner of the school's life. It is in the classroom, the library, the science lab, and, even in that last arena of techno-phobia: The gym.

Furthermore, Mainland High School is thriving, for Mainland is a school that takes great pride in its achievements. The school's solid partnership between the staff, the students, the parents, the community, and the businesses of the area makes this possible.

One measure of the school's confidence is that the staff already shares knowledge through workshops that they host at the local and national level. As Mainland looks towards the twenty-first century, it can confidently say that if the past few years are any indication, Mainland has a wonderful future.

A Commitment to Technology

Mainland High School's commitment to technology began in 1988. The school was selected by the Florida Department of Education to be a Model Technology School. The original grant gave Mainland $1.3 million, with the school renovations and improvements spanning five years. Additional grant monies of about $1.3 million were then secured by various teachers and administrators.

Mainland was an appropriate choice for a test site because of its size and diversity. The school is located on a 43-acre campus that was originally built in 1962. It now has 17 permanent buildings, 27 relocatable classrooms, and extensive athletic facilities.

The student body is almost 1,900 strong, with 38% minority representation. Of the 1,900 students, about 50% come from economically disadvantaged backgrounds. Entering freshman have test scores that typically fall at the lowest end of the district's results.

High Scores at Graduation

Yet when they leave Mainland as graduating seniors, their SAT and ACT scores put the students at or above the national average. And minority students place well above national scores for their respective racial or ethnic categories. All of this despite a school mobility rate that has ranged from 40 to 50 percent.

From the beginning, Mainland has drawn on all sectors of its community to create the Model Technology School. Teachers trained in the process of facilitative leadership assisted the school community in establishing goals for the program, timetables for implementation, and methods of evaluation. As a result, teachers in particular view the school's achievements with great pride.

Local and National Training

Teachers at Mainland are fully supported in technology. Once they have received training at the school level, the school sends them to national sites for further instruction. Some teachers are now basic technology instructors themselves, covering areas such as Teaching with Technology, Laser Disk Use, Microsoft Word Processing, Use of Fitness Technology, and Hypercard on the Macintosh.

Staff have also been trained in Yamaha Keyboards; CUPLE (Comprehensive Unified Physics Learning Environment) Program with Rensselaer Polytechnic Institute; and TI-81 Graphing Calculator Use in Algebra, Geometry, and Calculus.

So just what has all this planning, training, and money brought to Mainland?

Different Kinds of Technology at Mainland

The school now has over 500 computers, with at least one computer per classroom that connects with the network. Science rooms have computers at each lab station, and labs are available for whole classroom use.

Mainland has also put many other types of technology in place. There are laser disc players, heart-rate monitors, exercise equipment, and CD players. All of this equipment is used in many different ways: Students on the yearbook or literary magazine use scanners, computers, and Photo CD drives to create their publications; students in the fitness program can use software programs to assess their fitness levels and then create individualized fitness plans; and lastly, autistic and neurologically challenged students use computers to improve perception and to learn safety skills.

Partnerships with Business

In addition, Mainland has built partnerships with businesses that have resulted in pilot programs. Jostens, the yearbook publisher, is training students and providing software with templates and graphics to turn Mainland into a Beta pilot site. The staff has also made a partnership with Eastman Kodak, piloting Photo CD technology in the yearbook.

A Fitness and Wellness Program

Perhaps the program that is most unique at Mainland is the fitness and wellness program, which is a pilot for the state of Florida.

A physical education teacher at Mainland set the ball rolling, and the department submitted a grant to the Centers for Disease Control in Atlanta. Research supports the theory that obesity is the number one health problem among adolescents; and, at Mainland, computerized equipment helps students design and implement programs for themselves.

Mainland High School's list of technological innovations and successes is already long and impressive. But the fact that the school eagerly shares its expertise with the local and national community makes Mainland a unique learning center—a true School in the Age of Technology.

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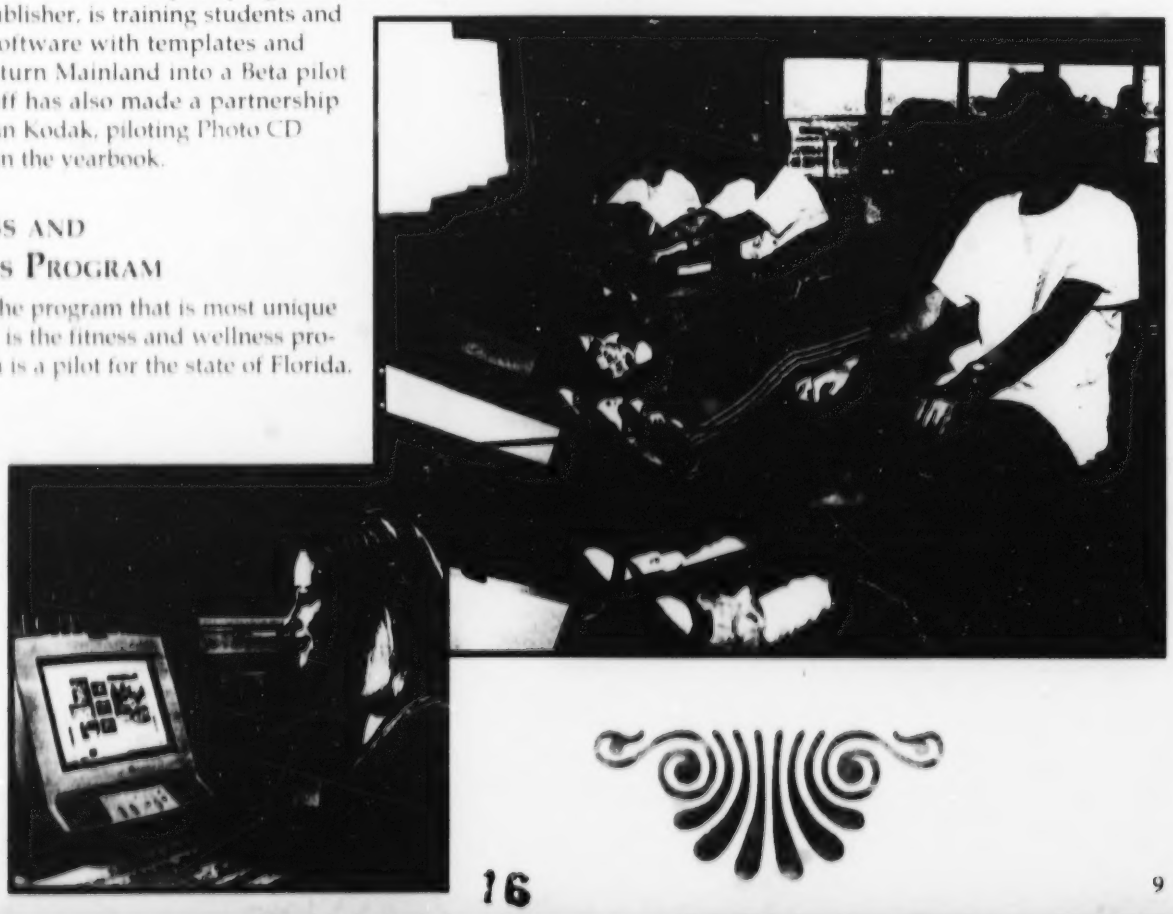

Maxwell Middle School

How do you measure success? At the Maxwell Middle School, students are mastering computer technology and heightening their self-esteem at the same time. Therefore, success can be measured on both a professional and personal level, ensuring that Maxwell's students will succeed on many more levels in the future.

Middle school years have always been tough for both kids and teachers—just ask any middle school child or teacher. Students are physically, emotionally, and intellectually struggling somewhere between childhood and adulthood. Teachers are acutely aware of the fact that if kids start to slip through the cracks now, chances are good that they won't make it in high school.

So how can schools increase the odds of student success? At the Maxwell Middle School in Tucson, Arizona, technology has helped turn a potentially "high risk" student population into a motivated, participating community. It has provided kids with a way to gain real-world, marketable skills, and set them on the road to becoming lifelong learners.

Setting Up Success

The story begins at the community and district level.

In the fall of 1990, clusters of administrators, district officials, and a member of the local computer sector held informal meetings to discuss how Tucson students could best be prepared for the demands of the twenty-first century.

What they came up with was a proposal that would fully integrate technology into the everyday life of students. As Don Collier, Principal of Maxwell Middle School put it, "We wanted to make a systemic change in the educational system. We call it the Fourth R. That's Reading, Writing, Arithmetic, and 'Ready for the World of Work.'"

A School at Risk

Located in the western section of Tucson Unified School District, Maxwell Middle School is 20 years old. It was built as a junior high school and is undergoing renovation to accommodate a middle school structure. Its population is 86% minority with 90% of students on free or reduced lunch status. In addition, absenteeism has always been a problem at Maxwell, and students were therefore considered at high risk for dropping out.

So when the school district decided to institute a Computer Classroom pilot program, Maxwell Middle School was an excellent choice for a site.

The Maxwell Middle School Computer Classroom Pilot began during the 1991-92 school year. The first computer classroom test group included about 120 seventh grade students and a team of four teachers. Each of the four classrooms received 20 PCs. The system was networked so that students could log on at any work site.

Support from Compaq and Microsoft

The pilot program continued for two years (1991-92, 1992-93). So positive were the results (higher student achievement scores, increased attendance, and heightened enthusiasm), that in the summer of 1993, Compaq computers agreed to support Maxwell by giving the school $1.5 million worth of hardware. This has allowed complete seventh and eighth grade technology access, curriculum integration, and restructuring for the 1993-94 school year.

Students now have access to 305 work stations (in an overall student population of about 600). Twelve classrooms are equipped with 20 PCs and color monitors that are integrated with a local area network. The computers are linked by Microsoft NT to a Compaq Systempro file server loaded with Microsoft Windows, Word, Excel, Q&E, and AutoSketch; as well as Microsoft's donation of Bookshelf, Dinosaurs, Encarta, Money, Ancient Lands,

Musical Instruments, Mozart, Schubert, Stravinsky, Beethoven, Strauss, Dangerous Creatures, Art Gallery, and Space Simulator.

Restructuring into Teams

In order to insure the full use of the technology available, staff in-servicing has been provided from the beginning. Using Title I funds as a base, Maxwell also began restructuring. All the teachers at the school are in teams, with the core area subjects forming the central portion of the education teams.

Every teacher has two planning periods in a seven-period day. The schedules are structured so that all members of a team have a number of common planning periods. In addition, team meetings are held daily to address team issues and curriculum and technology integration.

As faculty have become increasingly proficient in and knowledgeable about technology, their enthusiasm has raised staff involvement to an even greater level.

This is exactly what has happened with the students. Maxwell has 60 laptops, 30 of which are assigned to students, and 30 of which are available on a signout basis. When students can take their technology home, families become excited and involved, and students and families work together to solve problems and make discoveries. Recognizing the tremendous opportunity here, the school will next work to help parents communicate via e-mail in both English and Spanish.

More than Just Mastering Technology

At Maxwell Middle School, students are mastering technology—and finding that their self-esteem levels are rising, too. And sometimes, kids, without the fear of computers that many adults have, are outdoing their teachers in their understanding of technology.

At Maxwell, this isn't seen as a problem—quite the contrary. It means students are engaging in peer tutoring, and it frees teachers to work with students on a consultant basis, allowing those students who need it most to get extra help.

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We wanted to make a systemic change in the educational system. We call it the Fourth R. That's Reading, Writing, Arithmetic, and "Ready for the World of Work."

Honorable Mention

We congratulate the following ten schools which received certificates of Honorable Mention for the Fifth Annual Business Week Awards: Schools in the Age of Technology.

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Brenda McDowell, Technology Resource Specialist
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